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EXAMINER

CANTELMO, GREGG

ART UNIT PAPER NUMBER

1745

DATE MAILED: 04/04/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/776,385

Applicant(s)

CHRISTIANSEN, NIELS

Examiner

Gregg Cantelmo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 February 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All   b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

2. The information disclosure statement filed July 13, 2001 has been placed in the application file and the information referred to therein has been considered as to the merits.

### ***Drawings***

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the rim of the porous plate supporting a dense layer of electrolyte material must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

### ***Specification***

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or  
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.
- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

4. The disclosure is objected to because of the following informalities: there is no brief description of the drawings. Appropriate correction is required.

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Porous Planar Electrode Support in a Solid Oxide Fuel Cell.

***Claim Objections***

6. Claim 10 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The structure recited in claim 10 is already recited in claim 1. Claim 10 does not appear to provide any further structural features to the teachings of claims 1 and 2.

7. Claim 11 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. The structure recited in claim 11 is already recited in claim 2. Claim 11 is dependent upon claims 1-3 and thus includes the limitations of claim 2 therein. Therefore claim 11 does not appear to provide any further structural features to the teachings of claims 1-3.

8. Claim 17 is objected to because of the following informalities: Claim 17 is dependent upon use claim 9 and should recite a preamble to the operation and not to the SOFC for consistency. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claim 12 rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 12 recites that the dense layer is a ceramic and/or metallic layer. The only dense layer in the base and intervening claims of which claim 12 is dependent is a dense electrolyte layer. There is no support in the original disclosure for a ceramic and/or metallic dense electrolyte layer. The only dense layer that is disclosed as being a ceramic and/or metallic layer is the layer opposite the surface supporting the electrode active material. Claim 12 has been interpreted in light of the specification such that the material recited there is to the layer opposite the surface supporting the electrode active material and not the electrolyte.

11. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

12. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claim 4 recites the term "a further dense layer." The term "further" is misleading because it may be interpreted that an initial dense layer is provided. Applicant is advised to delete the term "further" from claim 4.

***Claim Rejections - 35 USC § 102***

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. Claims 1, 9 and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 08-037011-A (JP '011).

JP '011 discloses a solid oxide fuel cell (SOFC) with a planar support 9 in the form of a porous plate structure supporting on one planar surface a layer of electrode active material 10 and with internally elongated gas supply channels 11 formed inside the structure (abstract and Fig. 1 as applied to claim 1).

The apparatus is employed in generation of power from particulate matter containing gas (as applied to claim 9).

The SOFC comprises a planar support 9 in the form of a porous plate structure supporting on one planar surface a layer of electrode active material and with internally elongated gas supply channels formed inside the structure (Fig. 1 as applied to claim 10).

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15. Claims 1-4, 6, 7, 9-12 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by JP 03-055764-A (JP '764).

JP '764 discloses a solid oxide fuel cell (SOFC) with a planar support 1A in the form of a porous plate structure supporting on one planar surface electrode active material layers 3 and 5 and with internally elongated gas supply channels 2A formed inside the structure (abstract and Fig. 1 as applied to claim 1).

The surface opposite the side to the surface supporting the electrode active material is provided with a separator 6A which is gas impermeable and electronically conductive (abstract as applied to claim 2).

The separator layer 6A is a ceramic or metallic layer (as applied to claim 3).

The electrode layer 3 comprises an active material which facilitates anodic and cathodic reactions in the electrochemical cell. This layer is covered with an electrolyte layer 4. The electrolyte layer is considered a dense layer absent claim limitations defining the degree of density. Further the electrolyte layer is a solid layer and thus is clearly denser than liquid electrolytes (as applied to claim 4).

The edges, sides or rim of the plate is sealed with layer 19 and therefore the rim is gas impermeable (Fig. 4 as applied to claims 6 and 15).

The entire plate 1A, including the rim or edge of the plate, supports an electrolyte layer 4. The degree of density is not specified by the claim. The electrolyte layer is considered a dense layer absent claim limitations defining the degree of density. Further the electrolyte layer is a solid layer and thus is clearly denser than liquid electrolytes (as applied to claim 7).



The apparatus is employed in generation of power from particulate matter containing gas (as applied to claim 9).

The SOFC comprises a planar support 1a in the form of a porous plate structure supporting on one planar surface layers 3 and 5 of electrode active materials and with internally elongated gas supply channels formed inside the structure (Fig. 1 as applied to claim 10).

The surface opposite the side to the surface supporting the electrode active material is provided with a separator 6A which is gas impermeable and electronically conductive (abstract as applied to claim 11).

The separator layer 6A is a ceramic or metallic layer (as applied to claim 12).

16. Claims 1-17 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. patent No. 5,589,286 (Iwata).

Iwata discloses a solid oxide fuel cell comprising a porous plate structure 116A supporting on one planar surface a layer 116C of electrode active material and with internally elongated gas supply channels 118 formed inside the structure (Fig. 7). Layer 116A is porous (col. 7, ll. 55-63 as applied to claims 1 and 10).

A planar surface on opposite side to the surface supporting the electrode active material being provided with a layer of gas impermeable and electronic conductive material, in this case separator 149 (Fig. 7 as applied to claims 2 and 11).

The separator layer is lanthanum chromite (col. 4, line 43 as applied to claims 3 and 12).

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The electrode layer 116C is active in electrochemical anode reactions and the bottom surface of electrode layer 116C is covered by a dense layer 116B of electrolyte material. Note that the claims only require that the porous plate supports an electrode layer and electrolyte layer. The stacking arrangement of these layers can be in any order so long as they are supported by the porous plate (as applied to claims 4 and 13).

The porous plate 116A can be a high chromium alloy (col. 7, ll. 31-43 as applied to claims 5 and 14).

The rim of the porous plate is covered with the electrolyte layer and is made gas impermeable (Fig. 7 as applied to claims 6 and 13).

The sides (rim) and upper surface of the porous plate 116A supports the electrolyte layer 116B (Fig. 7 as applied to claims 7 and 15).

The porous substrate 116B is catalytically active in conversion of feed gas to fuel cell reactant gas (col. 7, ll. 50-63 as applied to claims 8 and 16).

The SOFC is used in generation of power from particular matter containing gas (as applied to claims 9 and 17).

### ***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. patent No. 6,048,636 is an English equivalent to WO 97/23007. EP 0722193 A1 discloses a porous support used in high temperature fuel cells. EP 0756347 A2 discloses a porous support used in SOFCs.

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18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (703) 305-0635. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (703) 308-2383. FAX communications should be sent to the appropriate FAX number: (703) 872-9311 for After Final Responses only; (703) 872-9310 for all other responses. FAXES received after 4 p.m. will not be processed until the following business day. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Gregg Cantelmo  
Patent Examiner  
Art Unit 1745

gc

  
April 3, 2003